

SIMTEK6469

IN THE UNITED STATES PATENT OFFICE

In re Application
Hideaki Takahashi

App. No.: 10/065312
Filed: October 2, 2002
Conf. No.: 7690
Title: PERMANENT MAGNET TYPE
ROTARY ELECTRIC MACHINE

Examiner: Y. Comas
Art Unit: 2834
Commissioner for Patents
P.O. Box 1450
Arlington, VA 22313-1450

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Ernest A. Beutler
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Dear Sir:

APPELLANT'S BRIEF
RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences the outcome of which would have a bearing on this appeal or which would be affected by the decision in this appeal.

REAL PARTY IN INTEREST

In addition to the appellant, the real party in interest is his assignee, Kabushiki Kaisha Moric, a Japanese company.

STATUS OF CLAIMS

Claims 1, 3-12 and 14-19 remain in this application. Although the Examiner has indicated in the Final Rejection that claims 15-19 would be allowable if rewritten in independent form, they were so rewritten when the Final Rejection was issued so it is assumed that only claims 1, 3-12 and 14 are before the Board on appeal. However in preparing this Brief appellant's attorney has noted that claim 10 is redundant and the appeal of that claim is withdrawn and the Board is asked to consider that claim 11 will be amended to depend on claim 9 if this appeal is successful. A clean copy of the claims on appeal appears in the Appendix to this Brief.

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STATUS OF AMENDMENTS

No amendment was proposed after the Final Rejection and the claims on appeal are as finally rejected.

APPELLANT'S INVENTION

Appellant's invention before the Board relates to a rotating electrical machine and particularly to one that includes a second electrical machine that is selectively operated when desired to cancel out the cogging torque of the primary machine only at desired times.

As is noted in the specification, rotating electrical machines may experience a condition known as "cogging". It has been well known that the periodic variation in the output torque of a brushless DC motor using permanent magnets due to a condition referred to as "cogging torque". This cogging torque is generated by the attractive or repulsive force between the permanent magnets and the magnetic poles or teeth on which the windings are formed. The period of this cogging torque is determined by the least common multiple of the number of permanent magnet poles and the number of slots formed between the teeth. Although various methods have been proposed for reducing or eliminating cogging torque, those have either been used or not used as the application demands. That is even though there may only be some instances when the cogging torque is a problem, all previous solutions as well as certain embodiments of this application have either always used a second device to cancel out the cogging torque at all times or have not attempted to cancel it out at all.

Thus the only embodiments of the application before the Board on this appeal are the electrically operated ones of FIGS. 5-7 and 8-10. The claims to the mechanically operated embodiment of FIGS. 11-13 have been allowed and thus are not before the Board.

The embodiments before the Board (FIGS. 5-7 and 8-10) embody smaller motors that are operated under low load and speed conditions where the cogging presents an objectionable situation but are switched off to conserve power when they are not needed and the cogging does not present a problem. The embodiments are described in detail by reference to the noted figures under the appropriate heading at paragraphs 0033-0038 and 0039-0042, respectively.

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ISSUES BEFORE THE BOARD

The issue before the Board is whether the subject matter of claims 1, 3-12 and 14 is obvious under 34 USC 103(a) from the teachings of JP 02254954 (Ono et al) in view of US Patent 6,278,216 (Li).

GROUPING OF THE CLAIMS

The following claim groupings stand or fall together.

Claims 1, 4 and 14.

Claims 5 and 6.

Claims 8, 9, 11 and 12.

The patentability of the remaining claims and these groups are argued separately.

APPELLANT'S ARGUMENTS

The issue before the Board here is not a simple one to decide, because it is admitted that the art could be combined to arrive at appellant's construction. Thus the Board must decide if that combination is taught from the cited art, but apart from appellant's teaching. It is most respectfully submitted that the art cited itself does not teach the combination because neither reference relied on by the Examiner refers to a situation where cogging may be a problem only under some operating conditions and thus it may be necessary to apply the cogging reduction under those conditions. It is submitted that lacking such a teaching to support the combination, the rejection can not be sustained as obvious.

The Examiner's basic reference is the Japanese Ono et al publication that shows two embodiments each of which provides cogging reduction, one by staggering two rows of permanent magnets and the other of which staggers to adjacent series of pole teeth that are commonly wound and must be simultaneously operated to achieve the anti-cogging operation. Neither embodiment has selective cogging reduction. Also neither embodiment even remotely suggests separate machines one of which can be selectively operated relative to the other.

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Thus we must consider if somehow Li, the secondary reference teaches selective cogging reduction. It clearly discusses the problem of cogging and the embodiments include some that have separately energized motors. However the separate energization is done to control the power consumption and not make the cogging reduction selective only under some conditions. It must be assumed that each individual motor itself is designed to reduce its own cogging not to cooperate with the other motor under certain operating conditions to provide a combined cogging reduction.

Thus claim 1 the only independent claim before the Board clearly defines a new and unobvious combination in its recitation "a selectively operable cogging torque canceling device for selectively generating a canceling cogging torque out of phase with and substantially canceling that of said primary assembly". The selectively operable device of Li does not perform this function nor does it provide any teaching how selective prevention could be accomplished in the Japanese publication because neither reference deals with that feature. Only appellant's construction accomplishes this.

Claim 3 depends on claim 1 and calls for the cogging reduction to be accomplished "only at lower speeds of relative rotation of the primary device". In Li the two motors are only both operated under high speed or load conditions. In addition and as noted above each machine is designed to accomplish cogging reduction on its own.

Claim 4 depends on claim 1 and stands or falls with it.

Claim 5 depends on claim 4 and specifically how the canceling cogging torque machine is related to the primary machine to develop the canceling cogging torque. The Japanese publication teaches this but requires energization of its single coil windings at all times and not necessarily in the claimed manner.

Claim 6 depends on claim 5 and stands or falls with it.

Claim 7 depends on claim 6 and further defines over the cited art in calling for "the phase difference between the first and second pair of relatively rotatable assemblies is equal to one half of the mechanical rotational angle of a single phase of the cogging torque of the first relatively rotatable assembly". The Examiner has not addressed this difference and therefore admits, as he should, that it is not taught by the cited art.

Claims 8, 9, 11 and 12 stand or fall together and require "the number of magnetic pole teeth of the second pair of relatively rotatable assemblies is equal to the coggings of the first pair of relatively rotatable assemblies during a single rotation thereof". Again the Examiner has not addressed this difference and therefore admits, as he should, that it is not taught by the cited art.


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Claim 14 stands or falls with claim 4 upon which it depends.

Thus it is most respectfully submitted that the Examiner has failed to make out a prima facie case of obviousness and is combining the references in an effort to anticipate appellants invention not on the basis of the prior art teaching but on appellant's own disclosure. Reversal of the Final Rejection is, therefore most respectfully requested.

Respectfully submitted:



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